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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/596,706

04/03/2007

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EXAMINER

SOOHOO, TONY GLEN

ART UNIT

PAPER NUMBER

1774

MAIL DATE

DELIVERY MODE

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/596,706	<b>Applicant(s)</b> MEINERS ET AL.	
	<b>Examiner</b> Tony G. Soohoo	<b>Art Unit</b> 1774	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 10/28/2010.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 21-24 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 21-24 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 June 2006 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)         | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)         | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Response to Amendment***

1. Applicant's cancellation of all claims previously acted upon, (claims 1-20), and the presentation of new claims 21-24 has necessitated a new grounds of rejection.

### ***Drawings***

2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the particular claimed elements of :

- a. Inlet channel
- b. 1<sup>st</sup> intermediate channel
- c. 2<sup>nd</sup> intermediate channel
- d. 2<sup>nd</sup> flow path
- e. Output channel
- f. Helical flow path having a chirality
- g. The plurality of separate micro fluidic elements
- h. Splitter element
- i. the "at least one mobius-like element" connected to the inlet channel"  
(claim 21, 23)
- j. the "combination element"
- k. the configuration and topologic structure of "wherein the micro fluidic elements define a fluidic, folding, mobius-like, topologic structure. (claim 21, 23)
- l. the flow path opposite the chirality of the 2nd flow path (claim 22)

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- m. the 1<sup>st</sup> mobius-like element (claim 22, 24)
- n. the 2<sup>nd</sup> mobius-like element (claim 22, 24)
- o. the substrate (claim 23)
- p. the mixer supported on the substrate (claim 23)

(these elements) **must be clearly shown and labeled with a corresponding numeral, or the feature(s) canceled from the claim(s).** No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

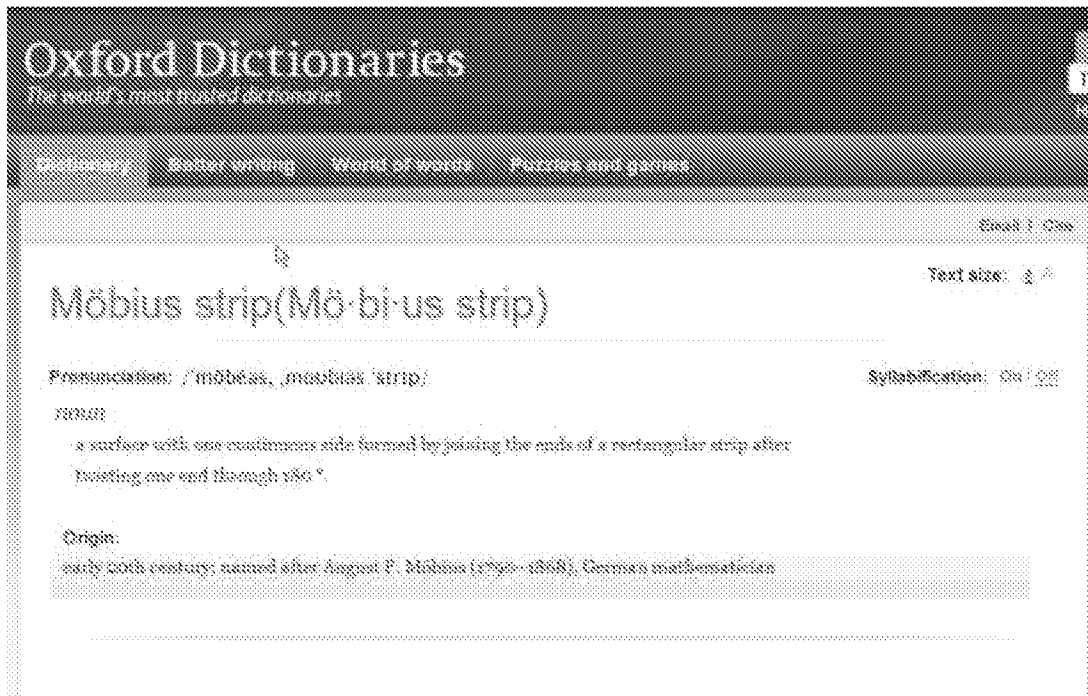
The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claims 21-24 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for a mixer with channels and flow paths, does not reasonably provide enablement for mobius-like element(s), and microfluidic elements which "define a fluidic, flowing , mobius-like, topologic structure". The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make the invention commensurate in scope with these claims. One can not determine the which structure is "mobius-like". The term "mobius" is not an commonly accepted definition and term in the art. The specification does not clearly define the structure of the "mobius-like" element and does not point to, or label the actual "mobius" element such that one may construct the element. One can not determine where the "mobius-like" element structurally ends and where the other structures of the channels, inlet and outlets begin and are connect to the "mobius-like" element.

5. The examiner has attempted to the use a dictionary meaning of "mobius". However a dictionary search does not clearly define or enable the meaning of "mobius" in a clear context of this application. "Mobius" is the surname of a 20th century

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mathematician. A search of the dictionary does not define "mobius" solely, but only yields the phrase "mobius strip".



6.

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The screenshot shows the Merriam-Webster website. At the top, there are navigation links: Word Games, Word of the Day, New Words & Slang, and Video. Below these are tabs for Dictionary, Thesaurus, Spanish-English, and Medical. The search bar contains the word "mobius".

Below the search bar, there is a section titled "Möbius strip". To the left of this section is a small image of a woman's face. Below the image is the text "up 10 Words With remarkable Origins".

To the right of the "Möbius strip" title is a small image of a Möbius strip. Below the title is the text "Definition of MÖBIUS STRIP".

The definition states: "a one-sided surface that is constructed from a rectangle by holding one end fixed, rotating the opposite end through 180 degrees, and joining it to the first end".

Below the definition is a section titled "Illustration of MÖBIUS STRIP". It contains a 3D diagram of a Möbius strip.

Below the illustration is a section titled "Origin of MÖBIUS STRIP". It states: "August F. Möbius †1858 German mathematician" and "First Known Use: 1904".

- 7.
8. No where in the drawings show the structural element which exhibits a single edged, one continuous sided surface of a mobius strip.
9. Applicant points to the paragraphs [0052], [0053], [0054], [0064], [0065] and [0060] of the specification in the published US pregrant publication 2007/0177458 as support to the claim language. However the vague contextual description in those

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paragraphs does not add any further description to "mobius" such that the structure is clearly and adequately described and defined so as one may be able to make the structural element in connection with the other elements of the invention, and it does not place the public on notice to the structural equivalents that may patentably infringe upon applicant's "mobius" element.

10. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

11. Claims 21-24 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The term "like" in the phrase "mobius" like renders the structure of "mobius" unclear in its metes and bounds, and its structural equivalents thereof.

Whereas the structure of a "mobius" (not a mobius strip) has not been adequately described and defined, the further term "mobius-like" renders the structure vague in its structural equivalents for patent protection.

The claims have been examined as best understood in light of the vagueness of the terminology.



***Claim Rejections - 35 USC § 103***

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

13. Claims 21-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Morishima et al 4050676.

The Morishima reference discloses in the figures 1-10-3 (in the same manner one of ordinary skill in the art may view applicant's instant drawings to see the structural elements of): - an inlet channel, a 1<sup>st</sup> intermediate channel, a first flow path, a second intermediate channel, second flow path, an output channel, -wherein on of the flow path is helical and having a chirality and plural separate fluidic element which may be able to handle large or smaller amounts of microfluidic volumes of fluid, a splitter element, a first and second "mobius-like" element, and opposite chirality. The flows are helical as if flows across the device.

Regarding the phrase "microfluidic mixer" the claims do not positively point to dimensions and volumes of the inlet, channel, or outlet which limit the apparatus in a structural difference to manner of processing in a micro-volume range. It is noted that a large scale mixer would be able to work with fluids of thousands of micro-fluid volumes.

The Morishima reference discloses by the showing of the drawing figures all of the recited structural elements as recited in the claim(s) in the same manner one of ordinary skill in the art may view applicant's instant drawing disclosure to see the structural elements. However the Morishima reference is silent as to the amount of helical configuration of the structure to provide (a relative degree of rotation greater than half pi and less than two pi),

$$\pi/2 < \text{Rotation Angle} < 2\pi \quad (\text{claim 21, 23});$$

and the mounting of the mixer on a substrate board (claim 23).

Regarding the degree of rotation angle, it is noted that the Morishima device has structure which provides a helical flow(s), but is silent as to the degree of the rotational angle. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the rotational angle to the recited amount whereas the degree of angular rotation provided by the device would be a direct variable in providing rotational mixing component. One may optimize the amount of rotational angle so as to provide the best gradient for fluid comingling in consideration to an offset of energy losses of the fluid flow as it is being rotated. This would be merely an optimization of the rotational angle of the structure to produce the helical flow, it has been held that where the general conditions of a claim are disclosed in the prior art (in this case the rotational angle), discovering the optimum or workable ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

Regarding claim 23 the use of mounting frames and brackets to hold a mixer or pipelines are notoriously old and well known to provide structural support of a mixer to hold it in position so it will not move. Frames and brackets are a substrate. It would have been obvious to one of ordinary skill in the art to provide a bracket or frame so as to better secure the mixer from moving or falling over during its use.

### ***Response to Arguments***

14. Applicant's arguments with respect to newly presented claim 21-24 have been considered but are moot in view of the new ground(s) of rejection.

### ***Conclusion***

15. Applicant's amendment in cancelling claims 1-20 and the presentation of new claims 21-24 has necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a).

Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

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16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tony G. Soohoo whose telephone number is (571) 272 1147. The examiner can normally be reached on 8AM-5PM, Tues-Fri.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Walter Griffin can be reached on 571-272-1189. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Tony G Soohoo/  
Primary Examiner, Art Unit 1774

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